AD-A143 328 MECHANICAL PROPERTY DATA 7175-T736 ALUMINUM ALLOY: HAND FORGING(U) DAYTON UNIV OH RESEARCH INST JUN 84 UDR-TM-84-20 F33615-82-C-5102 1/1

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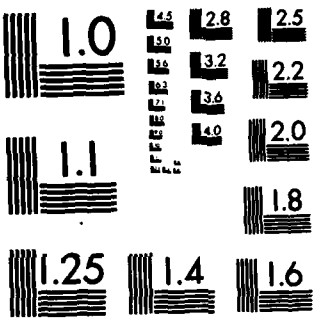

UDR-TM-84-20

MECHANICAL PROPERTY DATA
7175-T736 ALUMINUM ALLOY

HAND FORGING

JUNE 1984

Prepared By:

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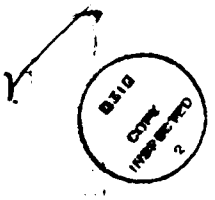
F33615-82-C-5102

This data sheet was prepared by the University of Dayton Research Institute under Contract No. F33615-82-C-5102, under the direction of the Air Force Wright Aeronautical Laboratories, Materials Laboratory, Mr. Neal Ontko, MLSA, Technical Monitor.

Notices



7175-T736 Aluminum Alloy Hand Forging

Material Description

This 7175 Aluminum Alloy, heat-treated to the T736 temper, was produced by ALCOA as a hand forging. Six plates were received in thicknesses ranging from 2 to 6.25 inches, widths ranging from 12 to 16 inches, and lengths of either 30 or 31 inches. This report contains data generated only from these six plates (heats).

The average chemical composition of the six heats is as follows:

Chemical Composition	Percent Weight
Silicon	0.078
Manganese	0.010
Magnesium	2.1
Iron	0.089
Copper	1.3
Zinc	5.3
Titanium	0.021
Chromium	0.190
Aluminum	Balance

Processing and Heat Treating

The 7175 aluminum alloy was processed into rectangular shapes by hand forging. The alloy plates were heat treated to the T736 temper.

Results

Only data from the six plates tested are included in this report. The average values for each property are listed in Table 1 by plate direction. The fatigue data and bands for the data are presented in Figures 1 and 2 for the longitudinal direction (notched and unnotched from multiple heats) and in Figures 3 and 4 for the long transverse direction from one heat only.

Table 1

7175-T736 Aluminum Alloy Hand Forging[a]

R.T.

Properties	Plate Direction		
	Longitudinal	Long Transverse	Short Transverse
Tension			
TUS, ksi (MPa)	72.3 (498.5)	71.6 (493.4)	71.6 (493.4)
TYS, ksi (MPa)	61.7 (425.7)	60.0 (413.7)	60.1 (414.4)
RA, percent	38.6	22.1	15.6
e, percent in 2 in. (50.8 mm)	22.1	15.6	8.9
E, 10^3 ksi (GPa)	10.23 (70.6)	10.18 (70.2)	10.04 (69.2)
Compression			
CYS, ksi (MPa)	64.9 (447.6)	64.3 (443.3)	63.8 (439.9)
E_c, 10^3 ksi (GPa)	10.54 (72.7)	11.02 (76.0)	10.92 (75.3)
Shear			
SUS, ksi (MPa)[b]	42.9 (295.7)	40.0 (275.8)	40.8 (281.3)
SUS, ksi (MPa)[c]	44.8 (308.9)	43.5 (299.9)	43.1 (297.2)
Bearing			
e/D = 1.5			
BUS, ksi (MPa)	114.5 (789.5)	110.3 (760.5)	115.2 (794.3)[d]
BYS, ksi (MPa)	92.9 (640.5)	88.8 (612.3)	95.9 (661.2)[d]
e/D = 2.0			
BUS, ksi (MPa)	146.8 (1012.2)	143.2 (987.4)	143.4 (988.7)[d]
BYS, ksi (MPa)	111.3 (767.4)	106.9 (737.1)	109.7 (756.4)[d]

(a) Values are average of triplicate room temperature tests conducted on six plates (heats) at the University of Dayton Research Institute under the subject contract.

(b) Double "rivet" pin shear tests conducted on all six heats for all three directions using 3/8 inch diameter x 1.5 inch long double "rivet" shear specimens.

(c) "Amsler" double pin shear tests conducted on all six heats for L and LT directions and on four heats (with thicknesses above 3.0 inches), using 3/8 inch diameter x 3.0 inch long specimens.

(d) Bearing tests in the short transverse direction were only conducted on 4 heats which had thicknesses of 3.75 inches and greater.

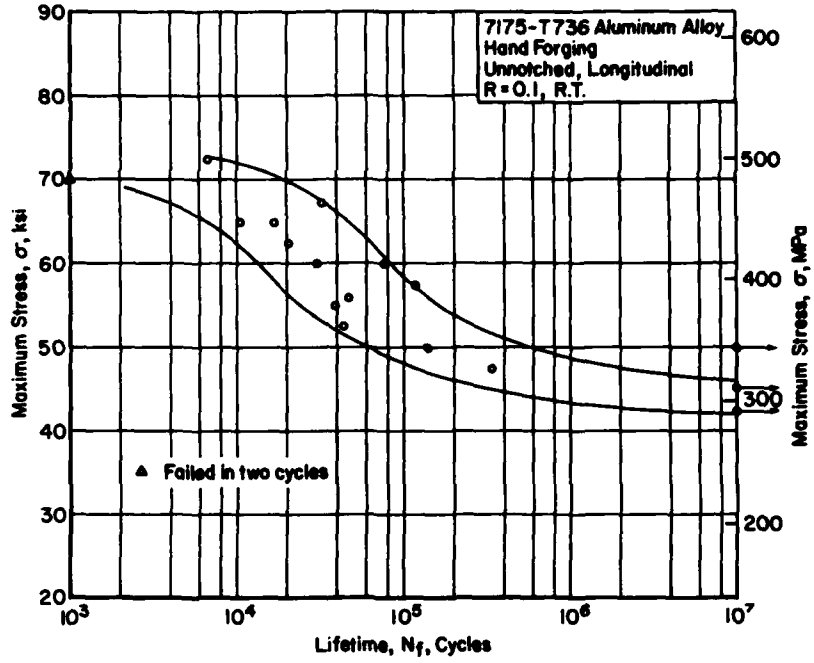


Figure 1. Axial load fatigue data (multiple heats).

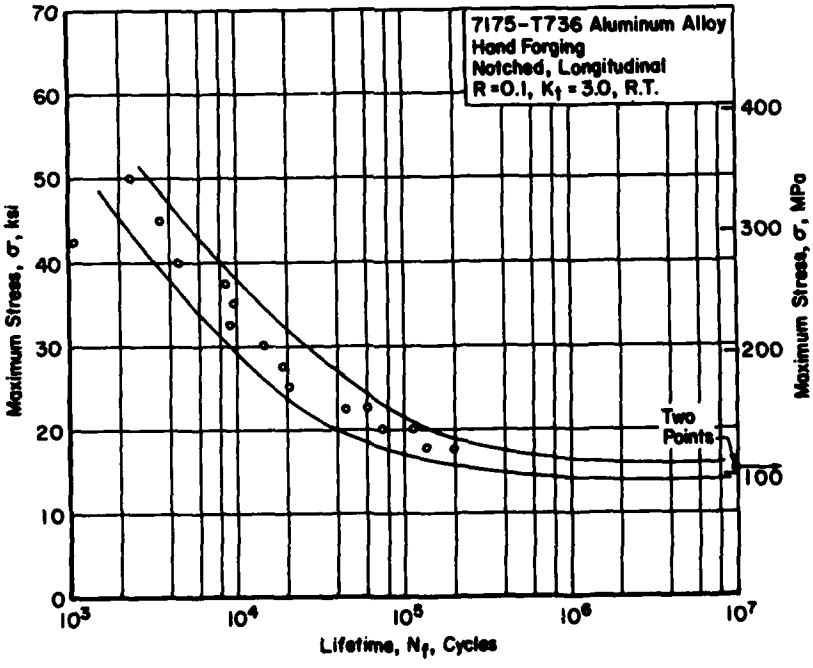


Figure 2. Axial load fatigue data (multiple heats).

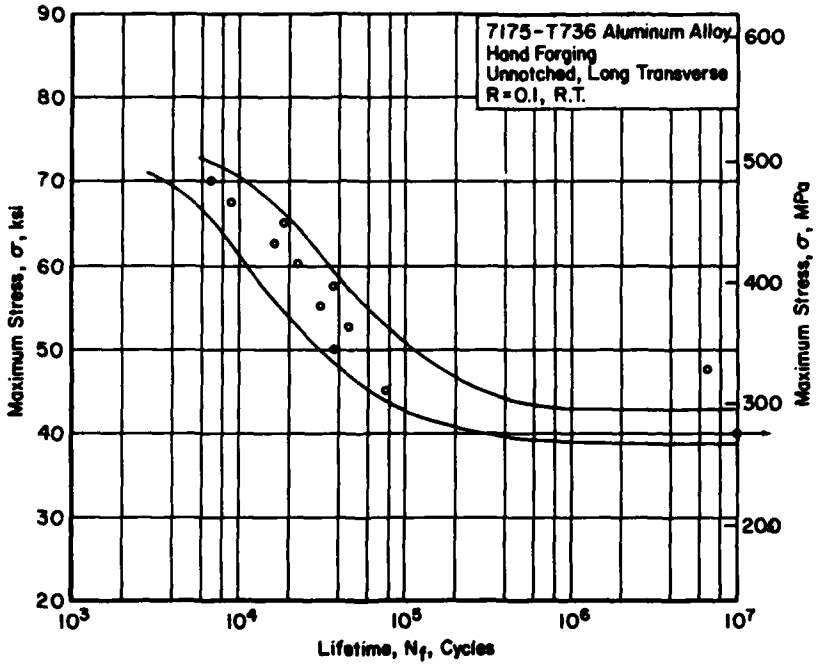


Figure 3. Axial load fatigue data (one heat only).

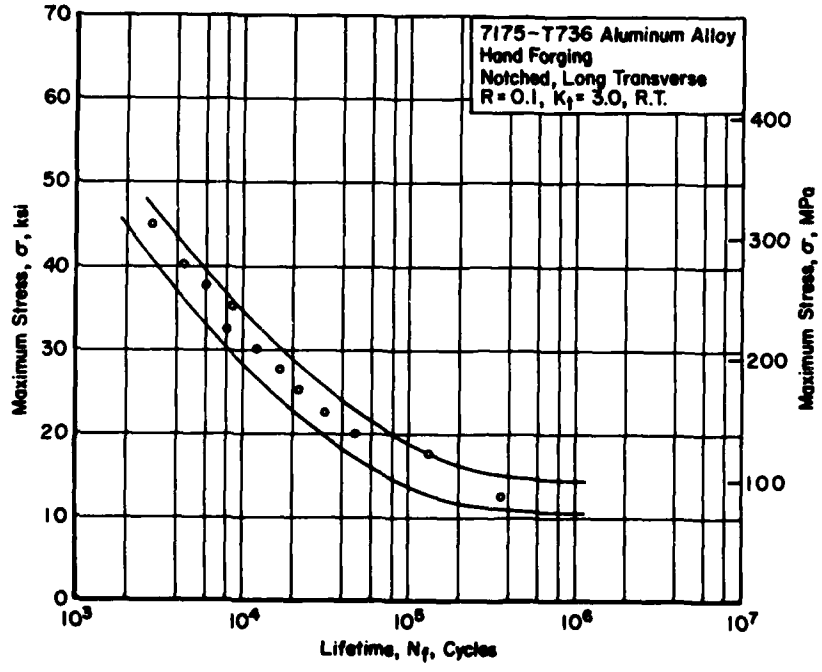


Figure 4. Axial load fatigue data (one heat only).

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